SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Lake Hanson, Hanson County

2102-F-21-R-48

2015

Figure 1. Lake Hanson, Hanson County

Legal Description: T102-R58-Sec. 21
Location from nearest town: 2 miles south of Alexandria, SD

Surface Area: 61 acres
Meandered (Y/N): no
OHWM elevation: none set
Outlet elevation: no data
Max. depth at outlet elevation: 14.5 feet
Observed water level: full
Contour map available: Yes

Watershed area: 40,053 acres
Shoreline length: 2.2 miles
Date set: NA
Date set: NA
Mean depth at outlet elevation: 6.3 feet
Lake volume: 381 acre-feet
Date mapped: 2010

DENR beneficial use classifications: (5) warmwater semi-permanent fish propagation, (7) immersion recreation, (8) limited-contact recreation and (9) fish and wildlife propagation and stock watering.

Introduction

General

Lake Hanson is an artificial impoundment constructed by the Works Progress Administration (WPA) in 1934. It was named by a local lake committee in honor of the county. On May 6, 2007, the emergency spillway section of the dam washed out following a major rain event and the lake was almost completely drained. The dam was repaired and the lake refilled later that summer.

Ownership of Lake and Adjacent Lakeshore Properties

The dam impounding Lake Hanson is owned by the South Dakota Department of School and Public Lands and the South Dakota Department of Game, Fish, and Parks (GFP) is responsible for managing the fishery. The land surrounding Lake Hanson is privately owned. However, two easements created in 1934 grant public access to a strip of land lying 12 feet above the ordinary high water mark around the entire lake.

Fishing Access

There is a concrete-plank boat ramp owned by Hanson County on the north side of the lake capable of handling most boats. Shore fishing is available at various sites along the north shore.

Water Quality and Aquatic Vegetation

Water clarity in Lake Hanson has varied from 30-86 cm (12-34 in) since 2006 (Table 1). This explains the generally low abundance of submerged aquatic vegetation observed during lake surveys over the same time period.

Table 1. Water temperature, Secchi depth and observations/comments on water quality and aquatic vegetation in Lake Hanson, Hanson County, 2006-2015.

Year	*Water Temp °C (°F)*	*Secchi Depth cm (in)*	*Observations/Comments (algae, aquatic vegetation, water quality, etc.)*
2015	24 (75)	61 (24)	Cattails and small amount of sago pondweed
2014	27 (82)	70 (27+)	Cattails and small amount of sago pondweed
2012	25 (77)	56 (22)	Cattails, sago pondweed and coontail
2010	26 (79)	75 (30)	Cattails and coontail
2008	26 (78)	86 (34)	Cattails, coontail, and sparse sago
2006	24 (75)	30 (12)	Sago, cattails, and coontail

Fish Community

Lake Hanson contains a diverse mixture of species commonly found in small impoundments and large lakes (Table 2).

Table 2. Fish species commonly found in Lake Hanson, Hanson County.

Game Species	*Other Species*
Largemouth Bass	Common Carp
Bluegill	White Sucker
White Crappie	
Black Crappie	
Channel Catfish	
Black Bullhead	
Yellow Perch	
Northern Pike	
Walleye	

Fish Management

Until recently, Lake Hanson has been managed as a typical largemouth bass/panfish fishery. However, poor water clarity and resulting lack of abundant submerged aquatic vegetation has prompted a change to manage the fishery for walleyes and panfish. So far, walleye stockings have failed to establish a population.

Table 3. Fish kill history for Lake Hanson, Hanson County.

Year	*Severity*	*Comments*
2006	Severe	Dam washed out and flushed most fish downstream

Table 4. Stocking history for Lake Hanson, Hanson County, 2006-2015.

Year	*Number*	*Species*	*Size*
2008	22,900	Bluegill	Fingerling
	6,560	Largemouth Bass	Fingerling
2014	55,000	Walleye	Fry
2015	3,840	Walleye	Small Fingerling

Methods

Lake Hanson was sampled on July 8-10, 2015 with three overnight gill nets and five overnight trap nets. The gill nets are 45.7 m long x 1.8 m deep (150 ft long x 6 ft deep) with one 7.6 m (25 ft) panel each of 13, 19, 25, 32, 38 and 51-mm-bar-mesh (½, ¾, 1, 1¼, 1½, and 2 in) monofilament netting. The trap nets are constructed with 19-mm-bar-mesh (¾ in) netting, 0.9 m high x 1.5 m wide (3 ft high x 5 ft wide) frames and 18.3 m (60 ft) long leads.

Results and Discussion

Net Catch Results

Black bullheads comprised 84.3% of the gill net catch and 99% of the trap net catch (Tables 5, 7). Over 90% of black bullheads sampled were less than 15 cm (6 in) in length (Tables 6, 8). Game fish numbers have yet to recover from the dam breach that occurred in 2007.

Table 5. Total catch from three overnight gill nets set in Lake Hanson, Hanson County, July 8-10, 2015.

Species	*#*	*%*	*CPUE*[1]	*80% C.I.*	*Mean CPUE**	*PSD*	*RSD-P*	*Mean Wr*
Black Bullhead	209	84.3	69.7	±24.6	63.0	0	0	--
Common Carp	18	7.3	6.0	±2.2	4.5	30	0	--
Northern Pike	12	4.8	4.0	±2.7	2.9	100	25	88
Black Crappie	5	2.0	1.7	±1.1	0.9	--	--	--
Channel Catfish	2	0.8	0.7	±0.4	0.5	--	--	--
White Crappie	1	0.4	0.3	±0.4	0.2	--	--	--
White Sucker	1	0.4	0.3	±0.4	0.0	--	--	--

*1 year (2014)

Table 6. CPUE by length category for selected species sampled with gill nets in Lake Hanson, Hanson County, July 8-10, 2015.

Species	*Substock*	*Stock*	*S-Q*	*Q-P*	*P+*	*All sizes*	*80% C.I.*
Black Bullhead	69.7	--	--	--	--	69.7	±24.6
Common Carp	2.7	3.3	2.3	1.0	--	6.0	±2.2
Northern Pike	--	4.0	--	3.0	1.0	4.0	±2.7
Black Crappie	0.3	1.3	1.3	--	--	1.7	±1.1
Channel Catfish	--	0.7	--	--	0.7	0.7	±0.4
White Crappie	--	0.3	0.3	--	--	0.3	±0.4
White Sucker	--	0.3	--	0.3	--	0.3	±0.4

Length categories can be found in Appendix A.

Table 7. Total catch from five overnight trap nets set in Lake Hanson, Hanson County, July 8-10, 2015.

Species	*#*	*%*	*CPUE*	*80% C.I.*	*Mean CPUE**	*PSD*	*RSD-P*	*Mean Wr*
Black Bullhead	5,058	99.0	1,011.6	±782.0	273.0	14	0	--
Black Crappie	22	0.4	4.4	±1.7	19.7	41	18	88
Bluegill	12	0.2	2.4	±1.7	11.0	8	0	93
Yellow Perch	4	0.1	0.8	±0.3	7.6	--	--	--
Channel Catfish	3	0.1	0.6	±0.5	0.4	--	--	--
White Crappie	3	0.1	0.6	±0.3	5.2	--	--	--
Common Carp	3	0.1	0.6	±0.5	0.7	--	--	--
Northern Pike	3	0.1	0.6	±0.5	1.5	--	--	--

*10 years (2006-2015)

[1] See Appendix A for definitions of CPUE, PSD, RSD, RSD-P and mean Wr.

Table 8. CPUE by length category for selected species sampled with trap nets in Lake Hanson, Hanson County, July 8-10, 2015.

Species	*Substock*	*Stock*	*S-Q*	*Q-P*	*P+*	*All sizes*	*80% C.I.*
Black Bullhead	941.2	70.4	60.4	10.0	--	1,011.6	±782.0
Black Crappie	--	4.4	2.6	1.0	0.8	4.4	±1.7
Bluegill	--	2.4	2.2	0.2	--	2.4	±1.7
Yellow Perch	--	0.8	--	0.8	--	0.8	±0.3
Channel Catfish	0.6	--	--	--	--	0.6	±0.5
White Crappie	--	0.6	0.2	0.2	0.2	0.6	±0.3
Common Carp	0.2	0.4	0.2	--	0.2	0.6	±0.5
Northern Pike	--	0.6	--	0.6	--	0.6	±0.5

Length categories can be found in Appendix A.

Table 9. Gill-net (GN), or trap-net (TN) CPUE for selected fish species sampled in Lake Hanson, Hanson County, 2006-2015.

Species	*Gear*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*
Black Bullhead	GN									56.3	69.7
	TN	--		--		46.6				306.6	1,011.6
Black Crappie	GN									--	1.7
	TN	74.2		5.8		11.2				2.8	4.4
Bluegill	GN									1.0	--
	TN	36.6		3.3		5.0				7.8	2.4
Channel Catfish	GN									0.3	0.7
	TN	0.8		0.5		0.2				--	0.6
Common Carp	GN									3.0	6.0
	TN	0.1		1.5		0.8				0.4	0.6
Largemouth Bass	GN									--	--
	TN	--		0.3		--				--	--
Northern Pike	GN									1.7	4.0
	TN	0.4		5.0		1.0				0.4	0.6
White Crappie	GN									--	0.3
	TN	2.4		2.0		19.8				1.2	0.6
Yellow Perch	GN									--	--
	TN	35.9		0.5		0.6				--	0.8

Bluegill

Management Objective

- None

Management Strategy

- Monitor the bluegill population during annual lake surveys and report the results.

Bluegill trap-net CPUE dropped to 2.4 this year (Table 10) and most of the fish sampled were less than 15 cm (6 in) (Figure 3). Very few bluegills grow large enough in Lake Hanson to be desirable to anglers.

Table 10. CPUE, PSD, RSD-P, and mean Wr for all bluegill sampled with trap nets in Lake Hanson, Hanson County, 2006-2015. Stocked years are shaded.

	2006	***2007***	***2008***	***2009***	***2010***	***2011***	***2012***	***2013***	***2014***	***2015***
CPUE	36.6		3.3		5.0				7.8	2.4
PSD	45		54		40				15	8
RSD-18	16		0		8				3	0
RSD-P	12		0		0				0	0
Mean Wr	96		95		91				95	93

Table 11. Bluegill stocked into Lake Hanson, Hanson County, 2006-2015.

Year	***Number***	***Size***
2008	22,900	Fingerling

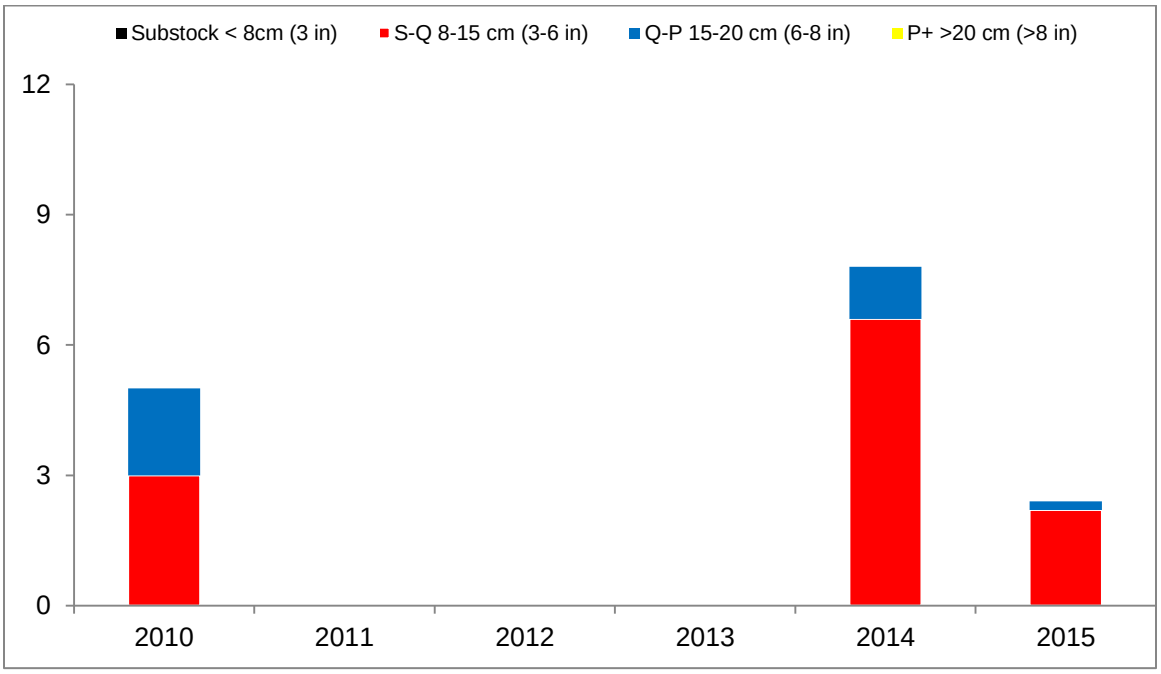

Figure 2. CPUE by length category for bluegill sampled with trap nets in Lake Hanson, Hanson, County, 2010-2015.

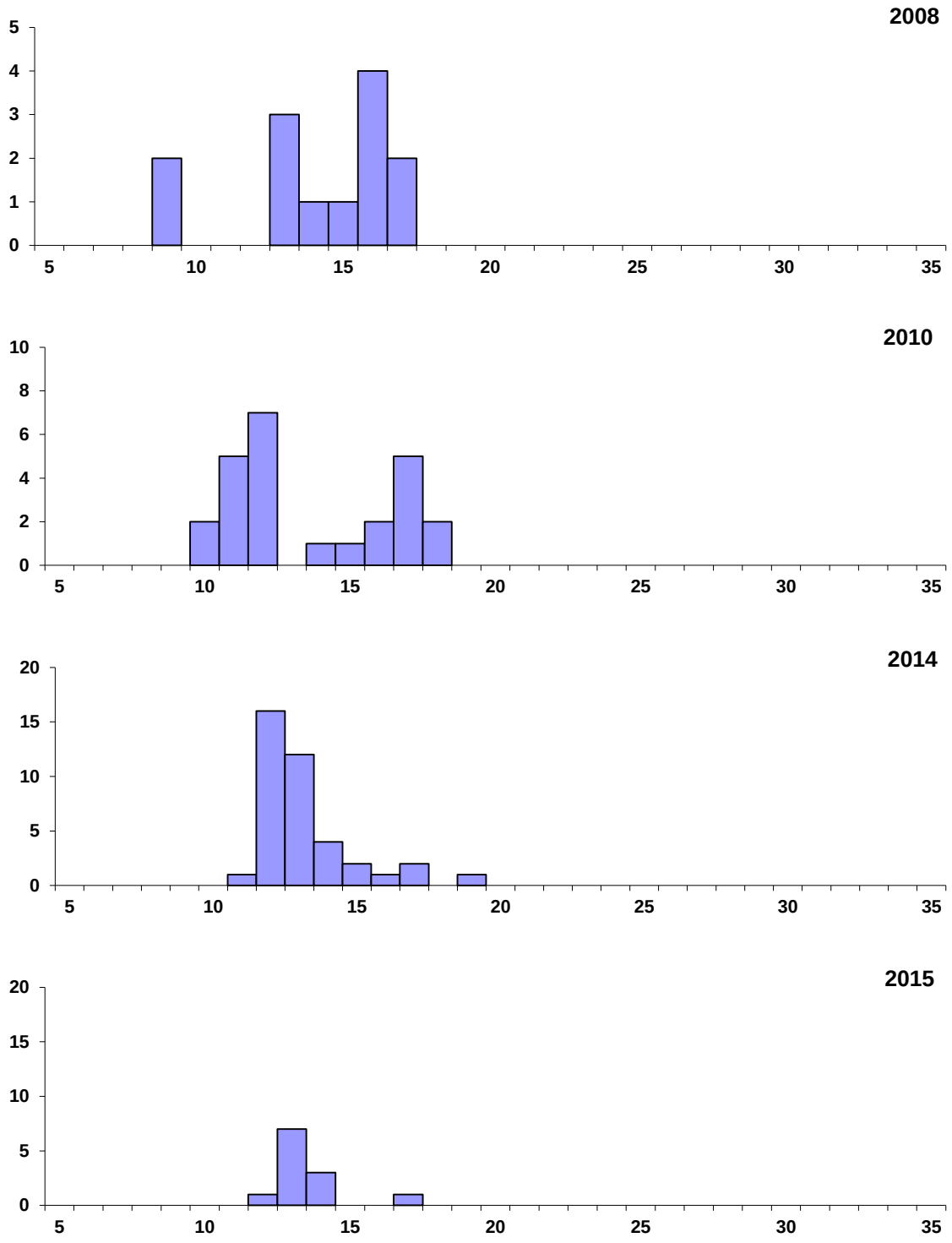

Figure 3. Length frequency histograms for bluegills sampled with trap nets in Lake, Hanson, Hanson County, 2008, 2010, 2014, 2015.

Black Crappie

Management Objective

- none

Management Strategy

- monitor the population during annual lake surveys and report the results

Black crappie CPUE increased slightly to 4.4 (Table 12) and several year classes are present with fish ranging in size from 13 cm-33 cm (~5 in – 13 in)(Figure 5).

Table 12. CPUE, PSD, RSD-P, and mean Wr for all black crappie sampled with trap nets in Lake Hanson, Hanson County, 2006-2015. Stocked years are shaded.

	2006	***2007***	***2008***	***2009***	***2010***	***2011***	***2012***	***2013***	***2014***	***2015***
CPUE	74.2		5.8		11.2				2.8	4.4
PSD	14		100		38				--	41
RSD-23	13		68		29				--	41
RSD-P	5		55		29				--	18
Mean Wr	99		107		92				--	88

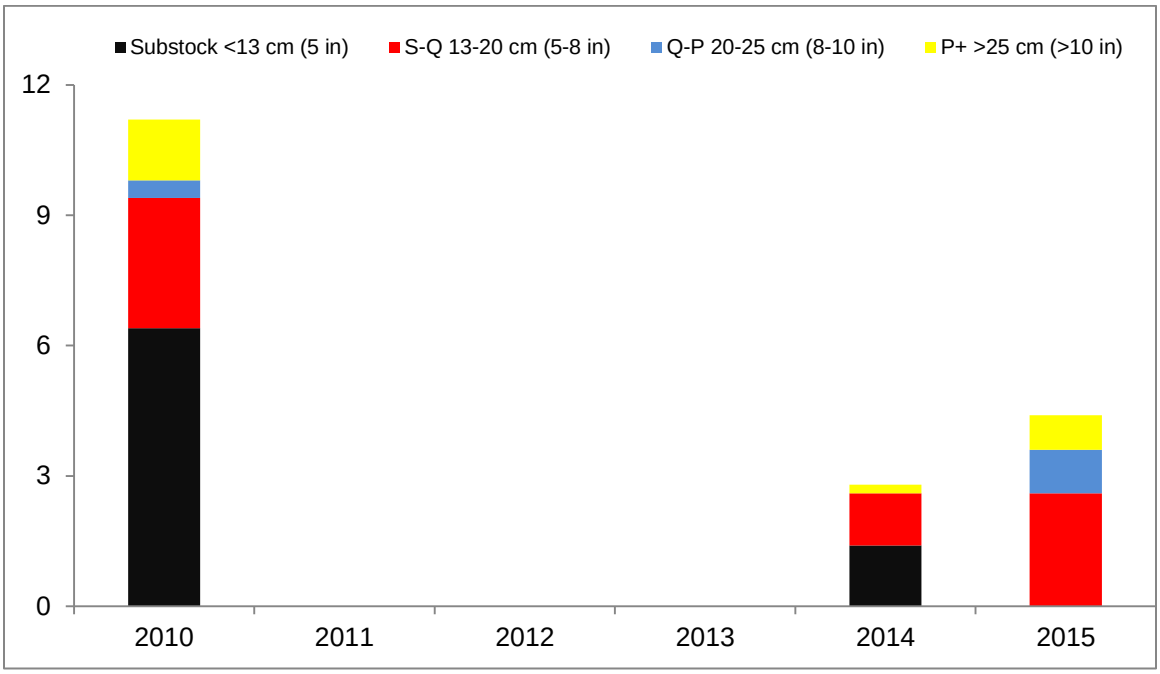

Figure 4. CPUE by length category for black crappie, sampled with trap nets in Lake Hanson, Hanson County, 2010-2015.

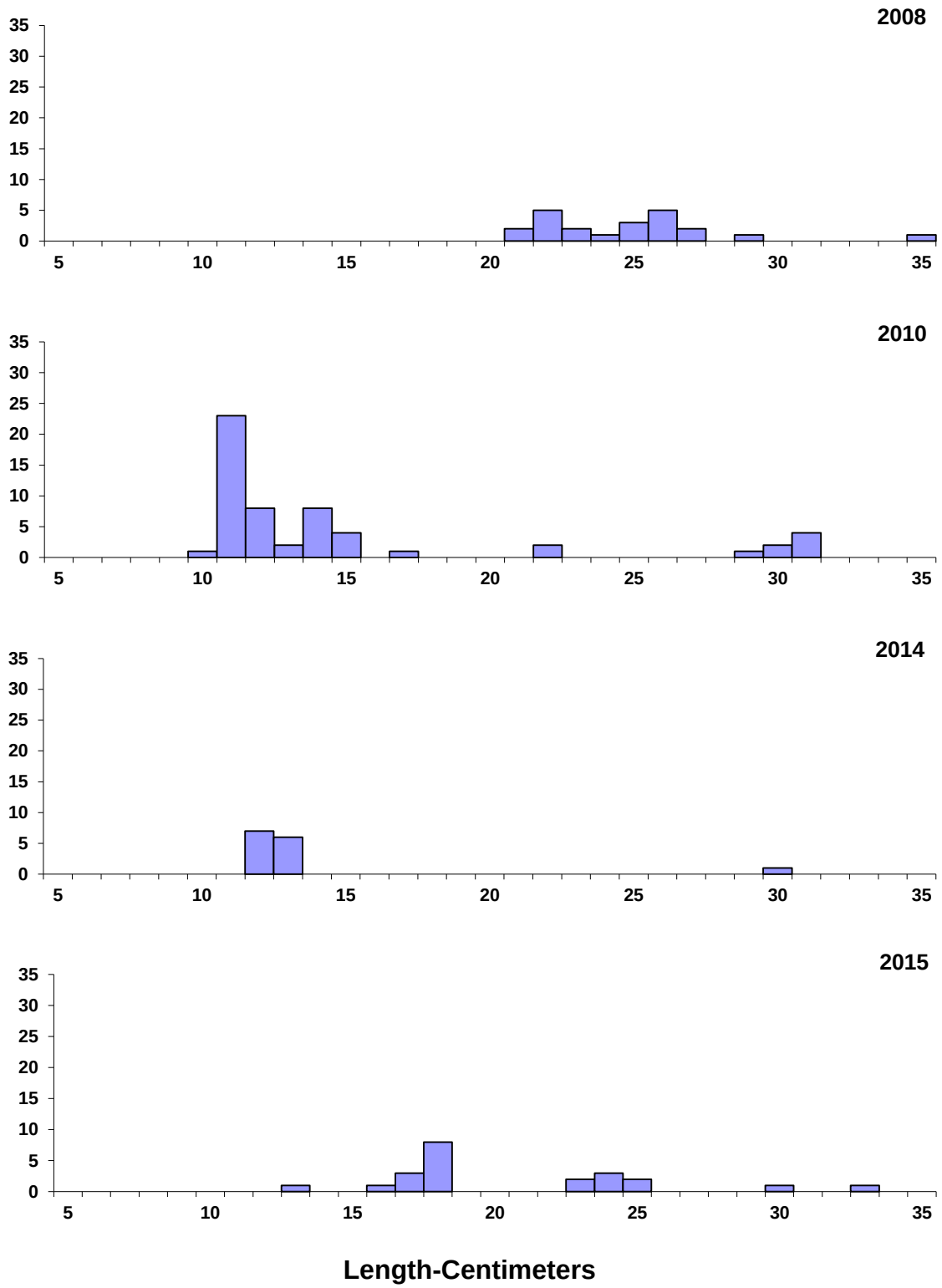

Figure 5. Length frequency histograms for black crappies sampled with trap nets in Lake, Hanson, Hanson County, 2008, 2010, 2014, 2015.

White Crappie

Management Objective

- none

Management Strategy

- monitor the white crappie population during annual lake surveys and report the results

Similar to black crappies, white crappie abundance has declined due to lack of natural reproduction for several years (Table 13). In 2015, only three white crappie were sampled. Lake Hanson has produced some very large white crappies at times (Figures 6, 7).

Table 13. CPUE, PSD, RSD-P, and mean Wr for all white crappie sampled with trap nets in Lake Hanson, Hanson County, 2006-2015. Stocked years are shaded.

	2006	***2007***	***2008***	***2009***	***2010***	***2011***	***2012***	***2013***	***2014***	***2015***
CPUE	2.4		2.0		19.8				1.2	0.6
PSD	68		--		16				--	--
RSD-23	64		--		14				--	--
RSD-P	64		--		14				--	--
Mean Wr	89		--		85				--	--

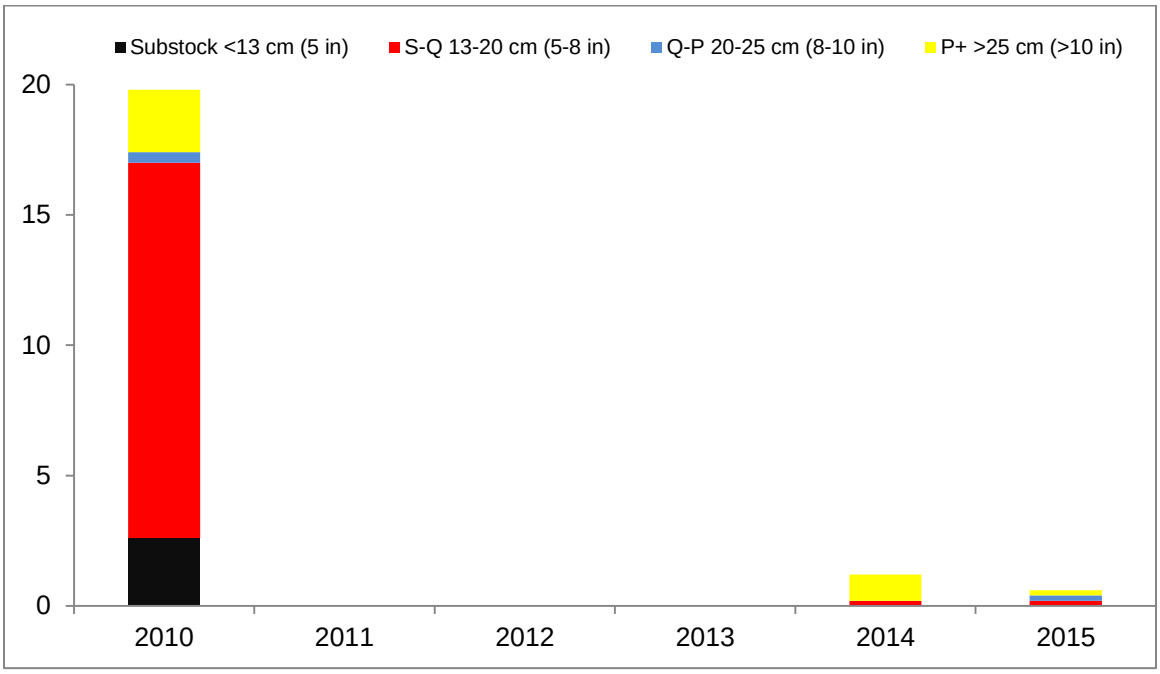

Figure 6. CPUE by length category for white crappie, sampled with trap nets in Lake Hanson, Hanson County, 2010-2015.

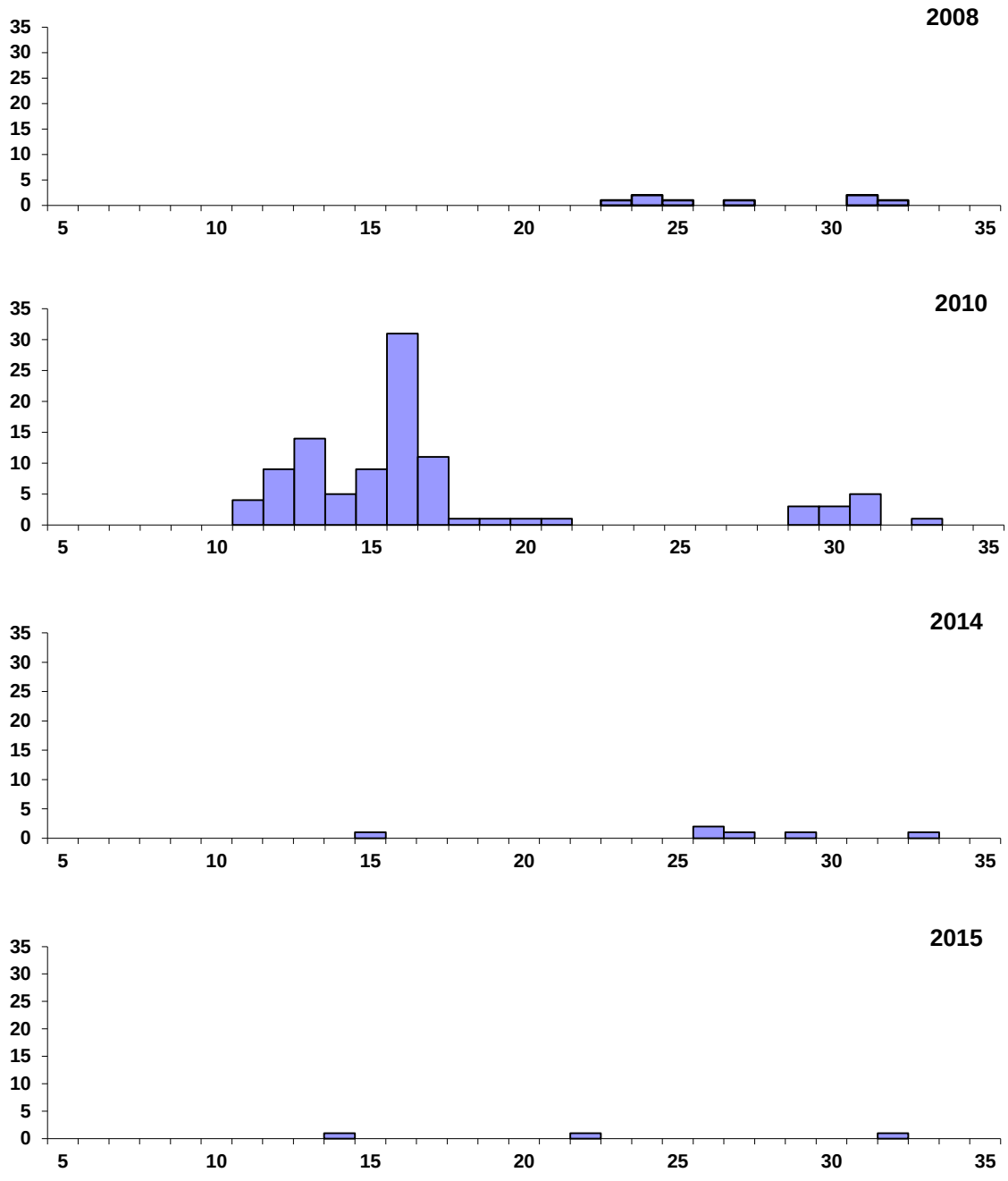

Figure 7. Length frequency histograms for white crappies sampled with trap nets in Lake, Hanson, Hanson County, 2008, 2010, 2014, 2015.

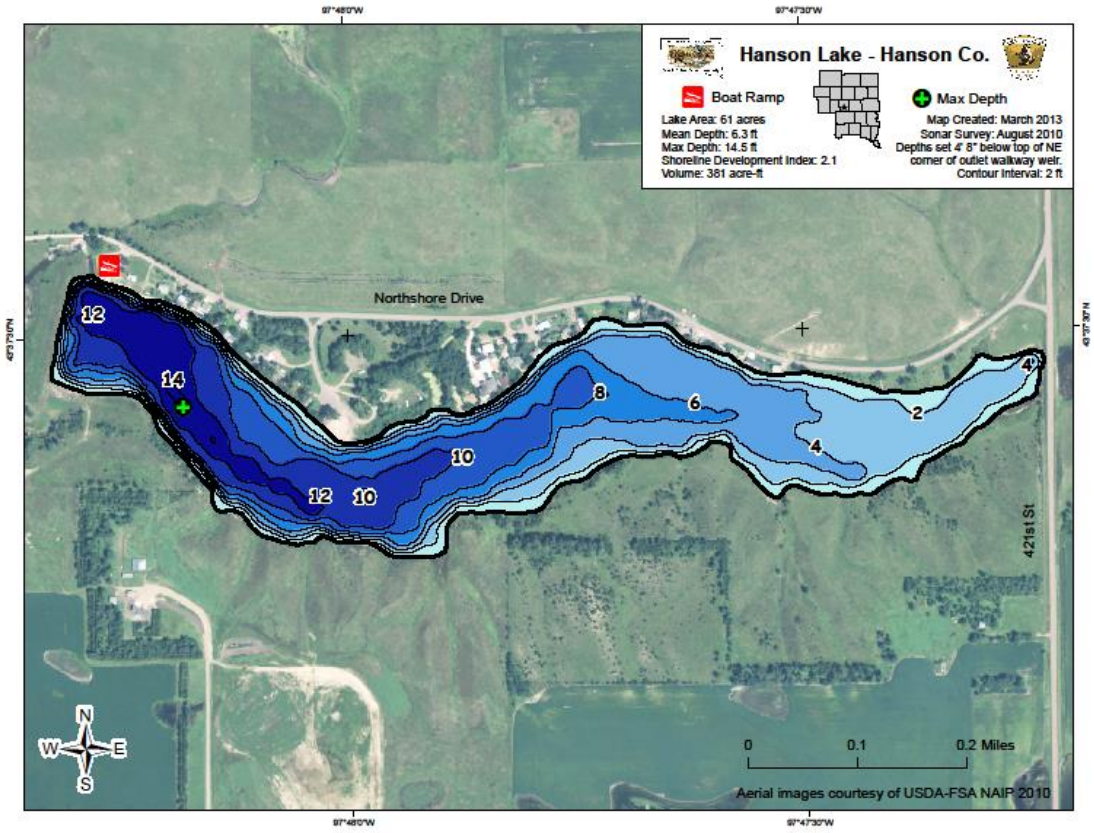

Figure 8. Contour map of Lake Hanson, Hanson County.

Appendix A. A brief explanation of catch per unit effort (CPUE), proportional stock density (PSD), relative stock density (RSD) and relative weight (Wr).

Catch per Unit Effort (CPUE) is the catch of animals in numbers or in weight taken by a defined period of effort. Can refer to trap-net nights of effort, gill net nights of effort, catch per hour of electrofishing, etc.

Proportional Stock Density (PSD) is calculated by the following formula:

$$PSD = \frac{\text{Number of fish} > \text{quality length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

Relative Stock Density (RSD-P) is calculated by the following formula:

$$RSD\text{-}P = \frac{\text{Number of fish} > \text{preferred length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

PSD and RSD-P are unitless and usually calculated to the nearest whole digit.

Size categories for selected species found in Region 3 lake surveys, in centimeters (Inches in parenthesis).

Species	Stock	Quality	Preferred	Memorable	Trophy
Walleye	25 (10)	38 (15)	51 (20)	63 (25)	76 (30)
Yellow perch	13 (5)	20 (8)	25 (10)	30 (12)	38 (15)
Black crappie	13 (5)	20 (8)	25(10)	30 (12)	38 (15)
White crappie	13 (5)	20 (8)	25(10)	30 (12)	38 (15)
Bluegill	8 (3)	15 (6)	20 (8)	25 (10)	30 (12)
Largemouth bass	20 (8)	30 (12)	38 (15)	51 (20)	63 (25)
Smallmouth bass	18 (7)	28 (11)	35(14)	43 (17)	51 (20)
Northern pike	35 (14)	53 (21)	71 (28)	86 (34)	112 (44)
Channel catfish	28 (11)	41 (16)	61 (24)	71 (28)	91 (36)
Black bullhead	15 (6)	23 (9)	30 (12)	38 (15)	46 (18)
Common carp	28 (11)	41 (16)	53 (21)	66 (26)	84 (33)
Bigmouth buffalo	28 (11)	41 (16)	53 (21)	66 (26)	84 (33)

For most fish, 30-60 or 40-70 are typical objective ranges for “balanced” populations. Values less than the objective range indicate a population dominated by small fish while values greater than the objective range indicate a population comprised mainly of large fish.

Relative weight (Wr) is a condition index that quantifies fish condition (i.e., how much does a fish weigh for its length). A Wr range of 90-100 is a typical objective for most fish species. When mean Wr values are well below 100 for a size group, problems may exist in food and feeding relationships. When mean Wr values are well above 100 for a size group, fish may not be making the best use of available prey.